

5. (Amended) A method for determining a volume of formation cut by each one of a plurality of roller cones on a drill bit drilling in earth formations, comprising:

selecting bit design parameters, comprising at least a geometry of a cutting element on the drill bit;

selecting at least one characteristic of an earth formation to be simulated as being drilled by the drill bit;

simulating drilling of the earth formation, the simulating comprising calculating from the selected bit design parameters and the selected earth formation characteristic, parameters for a crater formed when each one of a plurality of cutting elements on each of the roller cones contacts the earth formation, the parameters including at least a volume of the crater, simulating incrementally rotating the bit, and repeating the calculating of the crater parameters for a selected number of incremental rotations; and

combining the volume of each crater formed by each of the cutting elements on each of the roller cones to determine the volume of formation cut by each of the roller cones.

10. (Amended) A method for balancing axial forces acting on each one of a plurality of roller cones on a roller cone drill bit during drilling, comprising:

simulating the drill bit drilling through an earth formation, the simulating comprising calculating, from a geometry of cutting elements on each of the roller cones and at least one characteristic of an earth formation simulated as being drilled by the drill bit, an axial force acting on each of the cutting elements,

simulating incrementally rotating the bit and recalculating the axial forces acting on each of the cutting elements;

repeating the incrementally rotating and recalculating for a selected number of simulated incremental rotations;

combining the axial force acting on the cutting elements on each one of the roller cones; and

adjusting at least one bit design parameter, and repeating the simulating until a difference between the combined axial force on each one of the roller cones is less than a